

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: KISTLER, Leonard

SERIAL NO.: 10/649,343

ART UNIT: 1734

FILED: August 27, 2003

EXAMINER: Koch, G.R.

TITLE: DEVICE FOR APPLYING A COATING AGENT

AMENDMENT "B"

Director of the U.S. Patent
and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action of May 25, 2005, a response being due with a Request for Continued Examination by August 25, 2005, please consider the following remarks:

REMARKS

Upon entry of the present response, previous Claims 32 - 46 have been canceled and new Claims 47 - 54 substituted therefor. Reconsideration of the rejections, in light of the foregoing amendments and present remarks, is respectfully requested. The present amendments has been entered for the purpose of more clearly distinguishing the present invention from the prior art.

In the Official Action, it was indicated that Claims 33, 34, 38 and 41 - 45 were rejected under 35 U.S.C. § 103(a) as being obvious over the Falck patent in view of the Price patent. Claims 33, 41 and 43 were rejected as being obvious over the Estelle patent in view of the Price patent. Claims

34, 35 and 36 were rejected as being obvious over the Estelle '891 patent in view of the Estelle '325 publication. Claims 37 and 39 - 40 were rejected under 35 U.S.C. § 103(a) as being obvious over the Falck and Price patents in view of the Bleck patent. There is also a formality objection in that Claim 46 had been previously misnumbered.

As an overview to the present reply, Applicant has revised the previous claim language in the form of new Claims 47 - 58. In particular, new independent Claim 47 incorporates the limitations of original independent Claim 33, along with the limitations of previous dependent Claim 34. Applicant has renumbered the remaining claims. In particular, previously misnumbered dependent Claim 46 has been included herein as new dependent Claim 58.

Relative to the prior art rejections, Applicant respectfully contends that new independent Claim 47 is not obvious with respect to the Falck patent in view of the Price patent. In particular, in the Official Action, in paragraph 4 on page 2, it is indicated that the Falck patent teaches "a spray valve". Applicant respectfully disagrees with the Examiner's analysis. In the Falck patent, the term "spray coater" is used only in the description of related prior art (in column 1, lines 28 - 30). The Falck patent describes an invention that is an alternative to that prior art, along with other prior art. Nowhere throughout the text of the Falck patent is the term "spray" utilized to describe the Falck invention. The item indicated with reference numeral "78" in the Falck patent is not a spray valve, but, in fact, it is a solenoid valve that controls the flow of liquid coating material from a manifold 76 to a conduit 74 which leads to a felt holder 81. The felt holder 81 holds a felt coating discharger 68 (as described in column 6, lines 13 - 29 and Figure 8).

The apparatus in the Falck patent does not contain a nozzle. This is evident by the fact that the coating liquid is not sprayed out of the solenoid valve 78 onto the metal strip 12. Actually the

word “nozzle” does not appear in the text of the Falck patent. The function of homogeneously applying the liquid to the metal strip 12 is performed by the felt 68. This felt 38 is in contact with the metal strip 12. The liquid is not applied to the metal strip by spraying.

It is noted in the Official Action in paragraph 9 that “With regard to the spray valve of Falck being connected to the felt dispenser, the claims of the instant application do not exclude the presence of the felt applicator.” Applicant respectfully contends that this not a proper reason for denying the patentability of independent Claim 47. A person skilled in the art would not conclude that independent Claim 47, in any way, includes the use of a felt applicator. This is because a spray valve, which is defined in independent Claim 47, would be absolutely unnecessary if a felt applicator were used. Additionally, the function of homogeneously spreading the liquid over the substrate surface is accomplished by either one of these devices. If the creation of a coating thickness profile over the length of the substrate is desired, Applicant respectfully contends that spraying, as presently claimed, is clearly superior to application by a felt applicator. This is because the spongelike storage of fluid in a felt applicator precludes instantaneous changes of the coating thickness. Therefore, adding a felt between a spraying valve and the substrate would clearly be counterproductive. As such, Applicant respectfully contends that the inclusion of the felt applicator cannot be reasonably included in an interpretation of independent Claim 47.

In Price patent, the term “spray” is not used in the entire text of the patent. The Price patent teaches an apparatus for dispensing viscous fluid materials such as lubricants, sealants and adhesives in the form of a bead (see column 1, lines 9 - 15 and column 3, lines 6 - 11, along with Figure 1). The needle valve shown in the Price patent is not a spray valve. The valve seat 34 that controls the flow rate of material is located within the valve assembly 26 at a considerable distance from the

nozzle outlet 31 (column 4, lines 53 - 61 and column 6, lines 3 - 16). The viscous fluid material passes through a cylindrical passage 84 (which follows the valve seat 34) before entering the conical nozzle end 30 and finally reaching the nozzle outlet 31. This valve structure is very different from that of the present invention, as claimed. In the present invention, the valve seat is located immediately at the nozzle outlet, i.e. the closing means directly adjusts the size of the outlet area of the nozzle opening.

Relative to the obviousness rejection, one having ordinary skill in the art, when trying to improve upon the apparatus of the Falck patent, would not replace the felt applicator of the Falck patent with the valve of Price since the valve of Price is designed to discharge a material of high viscosity in the form of a bead. This is very unsuitable for atomizing a coating liquid in order to spread it homogeneously over a substrate surface. In the valve of the Price patent, even a fluid of low viscosity would leave the nozzle opening in the form of a jet or, in the case of low flow rate, of a trickle rather than in the form of a spray. This is because the passage 84 and the conical nozzle end 30 define such a large chamber between the valve seat 34 and the nozzle outlet 31 that any spray potentially created at the valve seat 34 would hit the inside surfaces of the walls of that chamber before reaching the nozzle outlet 31 and condense into a jet or into a sequence of drops, depending on the flow rate.

A further difference between the present invention, as now claimed, and the needle valve of Price patent is the direct actuation of the needle by a linear motor. This is more simple and cost effective, as well as faster, than the indirect electropneumatic actuation taught by the Price patent.

Paragraph 11 of the Official Action argues that the thickness profile that varies and the direct electromagnetic actuation of the needle valve are not recited in the rejected claims. Applicant

respectfully disagrees with the Examiner's analysis. The respective feature of independent Claim 47 specifically recites that . . . said positioning means being a linear motor with a current supply, . . .". The term "being" leaves no room for an interpretation of the claim which would include the pneumatic portion of the Price valve.

Applicant has included the limitations of previous dependent Claim 34 into the language of independent Claim 33. This concerns the measurement of the substrate position and regulation of the target value of the outflow rate according to a position-dependent desired coating thickness. This defines a feature of the present invention which concerns the ability of the present invention to create a longitudinal coating thickness profile on the substrate more precisely. This further distinguishes the present invention from the combined teachings of the Falck and Price patents.

Although the Falck patent describes a position/width sensor 30, this sensor detects only the position and width of the metal strip perpendicular to the direction of travel and its signal is only used to avoid discharging liquid into such sections of the felt, which extends laterally beyond the width of the metal strip 12 (see column 6, lines 30 - 41). This is quite different than the creation of a longitudinal coating thickness profile in accordance with the present invention. The Price patent utilizes a toolspeed signal 128 (see Figures 2 and 3) to adjust the flow rate in order to keep the amount of material discharged per length unit of the tool path constant. As a result, the control of the flow rate in Price patent is only the speed, but not the position, of the substrate.

In summary, the combined teachings of the Falck and Price patents does not make obvious the teaching of the present invention, as defined by independent Claim 47. The result of the combination of teachings would lead to a coating system which exhibits several substantial differences than that of the present invention. On this basis, Applicant respectfully contends that the

prior art combination would not make obvious the present invention, as defined by independent Claim 47.

Relative to the prior art rejection of the present invention based upon the combination of the Estelle '891 and the Price patent, Applicant respectfully contends that the Estelle '891 patent does not teach a spray valve having a nozzle opening which is adjustable by a closing means. The valve 50 of the Estelle '891 patent is equipped with a solenoid 48. This is only capable of either opening or closing the valve 50 completely. The valve 50 of Estelle '891 is just a binary on/off valve and not a valve with a continually adjustable cross section area (see column 5, lines 25 - 39). The Estelle '891 patent does not disclose any details whatsoever of the internal structure of the on/off valve 50. In particular, no action of the solenoid 48 on the cross section of the opening of the nozzle 24 is ever mentioned in the Estelle '891 patent. The solenoid 48 allows the mechanism of the valve 50 to be located within the housing at a distance from the opening of the nozzle 24. The Estelle '891 patent teaches the control of the flow of the coating liquid by varying its pressure through the speed of a motor 58 that drives a pump 52 (see the Abstract and Figure 1). This is an entirely different control method than that of the present invention and is based upon a different control variable.

Applicant respectfully disagrees with the Examiner's analysis on page 8 of the Official Action where the Examiner states that a person skilled in the art would improve upon the Estelle '891 invention by replacing the valve 50 with the valve of Price and using such that valve rather than the pump 52 as an analog flow control means. Such a person with ordinary skill in the art would immediately recognize that the design of the Price valve makes it very unsuitable for the task to be fulfilled for the reasons described hereinabove. On this basis, Applicant respectfully contends that

one having ordinary skill in the art would refrain from combining such a valve with the Estelle '891 apparatus. Even if the person would “unreasonably” decide in favor of such a combination, such a combination would not teach the present invention, as now claimed, in view of the considerable structural differences between the Estelle '891 patent and the Price valve. Applicant's attorney has great difficulty seeing how anyone with skill in the art could possibly combine these teachings other than through a hindsight analysis of the present invention.

Applicant respectfully contends that the limitations of previous dependent Claim 34, now incorporated into the language of independent Claim 47, further distinguishes the present invention from the combined teachings of the Estelle '891 patent and the Price patent. The Estelle '891 patent does not describe or suggest a substrate position measurement relative to the valve 50. The Estelle '891 patent does not suggest the instantaneous control of the outflow rate depending on the measured position value. This is acknowledged in paragraph 6 of the Final Office Action. According to Estelle '891 patent, the gun controller 38 sends on/off signals to the solenoid 48 on an output line 46. The gun controller 38 responds to signals on input lines 45 and 47 that are produced from a system controller 42. The system controller is activated by a trigger signal on an input line 40 (see column 5, lines 1 - 15). The origin of this trigger signal is not described, in any way, in the Estelle '891 patent. Such a trigger signal may, for example, come from a feeding apparatus which places the substrate 28 on the conveyor 30. This would not be regarded as an outflow rate control based on position measurement. According to Estelle '891 patent, the measured variable used for controlling the outflow rate by means of the pump 52 is the speed of the conveyor 30 transporting the substrate 28 (see the Abstract of the Estelle '891 patent).

The Price patent only uses a toolspeed signal 128 (see Figures 2 and 3) to adjust the flow rate in order to keep the amount of material discharged per length unit of the tool path constant. This is not a substrate position measurement and position-dependent control of the outflow rate as claimed in independent Claim 47. Since the features of previous dependent Claim 34 (now incorporated in independent Claim 47) are not anticipated nor shown by neither Estelle '891 patent nor the Price patent, Applicant respectfully contends that independent Claim 47 is not obvious in view of this combination of prior art references.

Applicant contends that independent Claim 47 herein is also not obvious in view of the Estelle '891 patent in view of the Estelle '325 publication. The Estelle '325 publication describes a trigger sensor 41 that provides a signal indicative of the substrate position. This is used for controlling a solenoid 48 that actuates a binary on/off valve 50 of the spray coating apparatus (see paragraphs [0023] and [0024]). In paragraph 6 of the Official Action, the Examiner argues that the Estelle '325 publication anticipates the features of previous dependent Claim 34 (now incorporated into independent Claim 47). Even if this were correct, one would now have to combine the teachings of three different prior art documents in order to arrive at the present invention as it is now claimed. Applicant respectfully contends that such a combination would not be “obvious” to one having ordinary skill in the art. Additionally, it is exceedingly complicated to see how such technology can, in any way, be reasonably combined.

The Estelle '325 publication teaches using the signal of the trigger sensor 41 only for switching the binary valve 50 on or off. The Estelle '325 publication does not provide for analog control of the outflow rate. As a result, the combination of the Estelle '891 patent and Estelle '325 patent would lead to a coating system, where the substrate position detected by the trigger sensor 41

would only be a criterion for switching the valve 50 on or off. The analog control of the flow rate by means of the pump 52 would still be based on the speed of the conveyor 50. The combination of this prior art with the Price patent would lead to a system in which the valve of the Price patent would replace the pump 52 as the actuator for the analog control of the outflow rate. However, the input signal of this analog control would still be the conveyor speed and not the substrate position. This is different from that of the present invention, as defined by independent Claim 47. There would now be only one actuator for two different control loops. This would raise the need for a particular dual input interface for that actuator (i.e. the Price valve). Applicant respectfully contends that there is no teaching for such an interface in the cited prior art combination.

In view of the considerable structural differences between the needle valve of the present invention and the needle valve of Price patent, as described hereinabove, the combination of the three prior art references still would not lead to the present invention, as defined by independent Claim 47. This prior art combination would still lack the structural features of the needle valve. On this basis, Applicant respectfully contends that one having ordinary skill in the art would not combine these prior art references and, as such, the present invention, as defined by independent Claim 47, is not obvious in view of these prior art references.

Dependent Claim 48 - 57 reflect the limitations of previous dependent Claims 35 - 44. Applicant notes that previous dependent Claim 46 was misnumbered. New dependent Claim 58 reflects the limitations of previous dependent Claim 46.

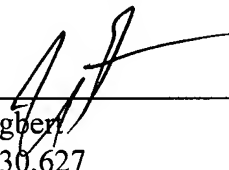
Based upon the foregoing analysis, Applicant contends that independent Claim 47 is now in proper condition for allowance. Additionally, those claims which are dependent upon Claim 47 should also be in condition for allowance. Reconsideration of the rejections is requested and

allowance of the claims at an early date is earnestly solicited. Since no additional claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

Date

8-24-05



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Sir:

I hereby certify that the attached correspondence comprising:

AMENDMENT "B"

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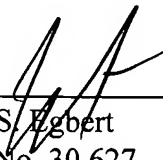
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